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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

MARCIA REID MARTIN et al.

Serial No.: 10/034,323

Filed: December 28, 2001

For: Data Management Appliance

Attorney Docket No.: 2001-057-SFT (STK01057PUS)

Group Art Unit: 2136

Examiner: Parthasarathy, Pramila

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Sir:

This is an Appeal Brief from the final rejection of claims 28-40 of the Office Action mailed on February 7, 2006 for the above-identified patent application.

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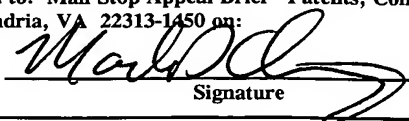
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I. REAL PARTY IN INTEREST

The real party in interest is Storage Technology Corporation ("Assignee"), a corporation organized and existing under the laws of the state of Delaware, and having a place of business at One StorageTek Drive, MS-4309, Louisville, Colorado 80028-4309, as set forth in the assignment recorded in the U.S. Patent and Trademark Office on April 17, 2002, at Reel 013100/Frame 0256. Assignee is now associated with Sun Microsystems, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to the Appellant, the Appellant's legal representative, or the Assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 28-40 are pending in this application, claims 1-27 having been canceled. Claims 28-40 have been rejected and are the subject of this appeal.

IV. STATUS OF AMENDMENTS

No amendments were presented in a response to the final Office Action mailed April 19, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention provides a data management appliance with the ability to retrieve mirrored versions of a storage device from the past. This permits monitoring for a troublesome change in the condition of data stored on the storage device and for the corrupted data to be restored to its latest correct state. (Page 33, line 28, through page 34, line 6.) The change in condition, or constraint, includes, for example, "to be virus free, to be a consistent database, to be error free, etc." (Page 35, lines 12-14.)

As provided in claim 28, the present invention includes method of monitoring data stored on a primary storage system (Figure 21, 2102; Figure 22, block 2202). A sequence of mirrors-in-the-middle (Figure 21, block 2106; Figure 22, block 2206) is created, each mirror-in-the-middle including a copy of data stored on the primary storage system at a fixed point in time. A first mirror-in-the-middle of the sequence is checked to see if a copy of data stored on the first mirror-in-the-middle satisfies at least one constraint (Figure 23, blocks 2302, 2304). If not, checking previous mirrors-in-the-middle in the sequence is repeated until one of the checked previous mirrors-in-the-middle includes an uncorrupted copy of data satisfying the at least one constraint (Figure 23, blocks 2308, 2310, 2312, 2314). (*See, for example*, page 35, lines 4-23.)

As provided in claim 35, a data management appliance (Figure 21, block 2104; Figure 22, block 2204) includes a random-access storage unit storing a sequence of mirrors-in-the-middle (Figure 21, block 2106; Figure 22, block 2206), each mirror-in-the-middle including a copy of data stored on a primary storage system (Figure 21, 2102; Figure 22, block 2202) at a fixed point in time. Control logic (Figure 21, block 2108; Figure 22, block 2208) checks a first mirror-in-the-middle of the sequence to see if a copy of data stored on the first mirror-in-the-middle satisfies at least one constraint (Figure 23, blocks 2302, 2304) and, if not, repeats checking previous mirrors-in-the-middle in the sequence until one of the checked previous mirrors-in-the-middle includes an uncorrupted copy of data satisfying the at least one constraint (Figure 23, blocks 2308, 2310, 2312, 2314). (*See, for example*, page 34, line 6, through page 35, line 3.)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 28-40 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,792,517 to Brunnett *et al.* (henceforth, "Brunnett").

Claims 28-40 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-33 of U.S. Patent No. 6,839,819 ("the '819 patent").

VII. ARGUMENT

Appellants respectfully request that the Board consider the following arguments and overturn the Examiner's rejections.

A. **Claims 28-40 Are Patentable Under 35 U.S.C. § 102(e) Over Brunnett**

Independent claim 28 provides a method of monitoring data stored on a primary storage system. A sequence of mirrors-in-the-middle is created. Each mirror-in-the-middle includes a copy of data stored on the primary storage system at a fixed point in time. A first mirror-in-the-middle is checked to see if a copy of data stored on the first mirror-in-the-middle satisfies at least one constraint. If not, checking previous mirrors-in-the-middle in the sequence is repeated until one of the previous mirrors-in-the-middle includes an uncorrupted copy of data satisfying the constraint.

Independent claim 35 provides a data management appliance including a random-access storage unit and control logic. The random-access storage unit stores a sequence of mirrors-in-the-middle with each mirror-in-the-middle including a copy of data stored on a primary storage system at a fixed point in time. The control logic checks a first mirror-in-the-middle to see if a copy of data stored on the first mirror-in-the-middle satisfies at least one constraint and, if not, repeats checking previous mirrors-in-the-middle in the sequence until one includes an uncorrupted copy of data satisfying the at least one constraint.

The Examiner rejected claims 28 and 35 as anticipated by Brunnett. In the final Office Action, the Examiner's sole support that Brunnett discloses Applicants' constraint checking is "Summary and Column 3 lines 35 - 53." The Examiner provided a more detailed reasoning in an Advisory Action mailed May 8, 2006.

As per claims 28 and 35, applicant argues that Brunnett does not teach "checking of a mirror-in-the-middle to see if a copy of data stored thereon satisfies at least one constraint", Examiner points to Brunnett Column 3 lines 35-53 and Column 5 lines 13-18 wherein Brunnett discloses if data satisfies a constraint, i.e.,

check the backup storage (mirrors-in-the-middle) to see if a copy of data satisfies one constraint (time).

Brunnett fails to teach two aspects of Appellants' invention. First, Brunnett does not disclose checking previous mirrors-in-the-middle in the sequence. Second, Brunnett does not disclose checking a copy of data to see if it satisfies at least one constraint.

Brunnett's invention appears to be subdividing a hard disk so that one portion holds an imaged backup of another portion. As such, the Summary of the Invention makes no mention of any kind of checking. The cited section from column 3 also makes no mention of constraint checking:

FIG. 2 is a block diagram of the control processes 50 of the disk which, in the illustrated embodiment, are embodied in the controller and in the disk's internal memory (comprising RAM 24 and ROM 26 in the illustrated embodiment).

In the illustrated block diagram, shown in FIG. 2, disk control processes 50 comprise ROM 26. A number of processing components are stored within ROM 26, some of which are illustrated in FIG. 2. Other processing components may be provided that are not specifically shown in FIG. 2. As shown in FIG. 2, within ROM 26, backup control software 52 and backup access control software 54 are each provided. In addition, ROM 26 has disk operating system software 58 and disk operational data 60. ROM 26 further comprises a password receipt and clearance mechanism 56.

Hardware switching mechanisms may be connected to backup access control software 54. In the illustrated embodiment, one or more jumpers 48a and switches 48b are coupled to backup access control software 54.

The cited section from column 5 and the following paragraph discloses only that data may be backed up at specific times.

The embodiment contemplates that the number of backup portions may be between one and two (more are possible), depending upon the available disk drive capacity and the desired security level. One copy could be for daily backups, while the second could be for weekly backups.

By way of example, consider the backup of one disk image in a backup portion 44, which is performed once a day.

At the time of the daily schedule backup, the entire drive content, including operating system data, is mirrored to the firmware controlled backup portion. All data in the hard disk is now stored at the same LBA number plus an offset as in the original storage area in the primary portion 46. Accordingly, if data is retrieved from the backup portion, because the original data area was damaged, the firmware can either copy this disk image data back to the same LBA number plus offset location in the primary portion, or the firmware can use the same LBA offset for referring to the data in the backup portion for access to the user in using the host. The old original area can now be used for the firmware controlled disk mirroring.

This neither teaches nor even suggests either checking previous mirrors-in-the-middle in a sequence or checking a copy of the data itself to see if the data satisfies at least one constraint.

Contrary to Applicants' invention, Brunnett discloses accessing back-up information without any constraint checks.

The disk may be provided with two alternate modes: in a first mode, the host, whenever it accesses data (reading or writing) in the hard disk, uses the primary portions of the disk media, and in a second mode, the host uses the backup portion of the disk media. When a given block is specified by the host for retrieval or for writing, if the hard disk is set to be in the first mode, that block of information is read from or written to a location within the primary portion. If the hard disk is in the second mode, that given block will be read from or written to a location within the backup portion. Alternatively, the backup area could always be accessible by the host, but in a read-only capacity.

Brunnett, col. 4, ln. 58-col. 5, ln. 2.

There is no disclosure in Brunnett that finding the desired backup requires any checking of previous mirrors-in-the-middle in a sequence of mirrors-in-the-middle. Rather, Brunnett discloses going directly to the desired backup data. Moreover, there is no disclosure in Brunnett that any copy of data is checked to satisfy some constraint. Once again, Brunnett discloses going directly to the desired backup data.

Brunnett neither teaches, nor fairly suggests, Appellants' checking of a mirror-in-the-middle to see if a copy of data stored thereon satisfies at least one constraint or of repeating checking previous mirrors-in-the-middle in the sequence of mirrors-in-the-middle until one of the checked previous mirrors-in-the-middle includes an uncorrupted copy of data satisfying the at least one constraint. Claim 28 and 35 are patentable over Brunnett. Claims 29-34, which depend from claim 28, and claims 36-40, which depend from claim 35, are therefore also patentable.

**B. Claims 28-40 Are Patentably Distinct
From Claims 1-33 Of The '819 Patent**

Because the application on appeal and the '819 patent share the same filing date, a one-way test for obviousness applies. In other words, are the appealed claims an obvious variation of the invention defined in the claims of the '819 patent?

In the final Office Action, the Examiner's only support was to state that "creating a sequence of mirrors-in-the-middle, each mirror-in-the-middle including a copy of data stored on the primary storage system at a fixed point in time; can be random-access storage unit storing a mirror-in-the-middle containing a copy of contents of a primary storage device at a fixed point in time." In the Advisory Action, the Examiner provided additional support.

Examiner maintains Double patenting rejection and directs the applicant to Claim 5, 6 and 7 of the '819 patent "wherein the random-access storage unit stores a MIM containing a copy of contents of a primary storage device at a fixed point in time" which is the same as "check to see if data satisfies a constraint", as "constraint" can be a time sensitive updates.

For reference, claims 1, 5, 6, and 7 of the '819 patent are provided as follows:

1. A data management appliance, comprising: a random-access storage unit storing a forward journal and a backward journal; and control circuitry adapted to receive commands from a host computer system, the control circuitry combining the commands to obtain a net change, the control circuitry deriving an inverse of the net change based on a

starting address and lengths associated with the net change, the inverse of the net change recorded as a snapshot in the backward journal, wherein in response to the control circuitry receiving a write command from the computer system, the control circuitry updates the random-access storage unit to include information associated with the write command and in response to a read command including a logical address and a time value, the control circuitry retrieves, from the random-access storage unit, data representing contents of the logical address at a time represented by the time value.

5. The data management appliance of claim 1, wherein the random-access storage unit stores a mirror-in-the-middle (MIM) containing a copy of contents of a primary storage device at a fixed point in time.

6. The data management appliance of claim 5, wherein the random-access storage unit stores at least one snapshot containing changes, that when made to contents of the mirror-in-the-middle (MIM), would result in a previous version of the contents of the primary storage device.

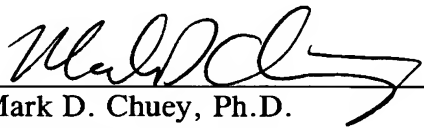
7. The data management appliance of claim 6, wherein the control circuitry stores a mapping object, wherein the mapping object maps logical addresses into physical addresses on the mirror-in-the-middle (MIM) and contained in the at least one snapshot.

None of these claims teach or fairly suggest checking previous mirrors-in-the-middle in a sequence of mirrors-in-the-middle if data stored on a first mirror-in-the-middle does not satisfy at least one constraint.

The fee of \$500 as applicable under the provisions of 37 C.F.R. § 41.20(b)(2) is enclosed. Please charge any additional fee or credit any overpayment in connection with this filing to Deposit Account No. 19-4545.

Respectfully submitted,

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Date: July 13, 2006

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Enclosure - Appendices



VIII. CLAIMS APPENDIX

Claims 28-40, as follows, are pending in this application:

1.-27. (canceled).

1 28. A method of monitoring data stored on a primary storage
2 system comprising:

3 creating a sequence of mirrors-in-the-middle, each mirror-in-the-
4 middle including a copy of data stored on the primary storage system at a fixed point
5 in time;

6 checking a first mirror-in-the-middle of the sequence of mirrors-in-the-
7 middle to see if a copy of data stored on the first mirror-in-the-middle satisfies at
8 least one constraint; and

9 if not, repeating checking previous mirrors-in-the-middle in the
10 sequence of mirrors-in-the-middle until one of the checked previous mirrors-in-the-
11 middle includes an uncorrupted copy of data satisfying the at least one constraint.

1 29. The method of claim 28 further comprising restoring the
2 uncorrupted copy of data to the primary storage system.

1 30. The method of claim 28 wherein checking comprises scanning
2 for viruses.

1 31. The method of claim 28 wherein checking comprises
2 monitoring a database for consistency of constraints.

1 32. The method of claim 28 further comprising storing the
2 sequence of mirrors-in-the-middle using a data management appliance.

1 33. The method of claim 28 further comprising restoring the copy
2 of data stored on the first mirror-in-the-middle to the primary storage system if the
3 copy of data stored on the first mirror-in-the-middle satisfies the at least one
4 constraint.

1 34. The method of claim 28 further comprising:
2 if the copy of data stored on the first mirror-in-the-middle satisfies the
3 at least one constraint, checking a copy of data stored on at least one additional
4 mirror-in-the-middle later in the sequence of mirrors-in-the-middle than the first
5 mirror-in-the-middle to see if the copy of data stored on the at least one additional
6 mirror-in-the-middle satisfies the at least one constraint.

1 35. A data management appliance comprising:
2 a random-access storage unit storing a sequence of mirrors-in-the-
3 middle, each mirror-in-the-middle including a copy of data stored on a primary
4 storage system at a fixed point in time; and
5 control logic in communication with the random-access storage unit,
6 the control logic operative to checking a first mirror-in-the-middle of the sequence
7 of mirrors-in-the-middle to see if a copy of data stored on the first mirror-in-the-
8 middle satisfies at least one constraint and, if not, repeating checking previous
9 mirrors-in-the-middle in the sequence of mirrors-in-the-middle until one of the
10 checked previous mirrors-in-the-middle includes an uncorrupted copy of data
11 satisfying the at least one constraint.

1 36. The data management appliance of claim 35 wherein the control
2 logic is further operative to restore the uncorrupted copy of data to the primary
3 storage system.

1 37. The data management appliance of claim 35 wherein checking
2 comprises scanning for viruses.

1 38. The data management appliance of claim 35 wherein checking
2 comprises monitoring a database for consistency of constraints.

1 39. The data management appliance of claim 35 wherein the control
2 logic is further operative to restore the copy of data stored on the first mirror-in-the-
3 middle to the primary storage system if the copy of data stored on the first mirror-in-
4 the-middle satisfies the at least one constraint.

1 40. The data management appliance of claim 35 wherein the control
2 logic is further operative to check a copy of data stored on at least one additional
3 mirror-in-the-middle later in the sequence of mirrors-in-the-middle than the first
4 mirror-in-the-middle to see if the copy of data stored on the at least one additional
5 mirror-in-the-middle satisfies the at least one constraint if the copy of data stored on
6 the first mirror-in-the-middle satisfies the at least one constraint.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.